

What is Claimed Is:

1. A polishing apparatus comprising:

a polishing tool;

a substrate holding member to hold a substrate and to press a surface of the substrate against
5 said polishing tool, said substrate holding member including a guide ring for holding an outer
periphery of the substrate; and

a first failure detection sensor for detecting a failure of the substrate inside of said guide ring,
said first failure detection sensor being disposed at said substrate holding member or in the vicinity
of said substrate holding member.

2. The polishing apparatus according to claim 1, further comprising a second failure detection
sensor for detecting a failure of the substrate under said guide ring.

3. The polishing apparatus according to claim 1, further comprising a second failure detection
15 sensor for detecting a failure of the substrate outside of said substrate holding member.

4. The polishing apparatus according to claim 1, further comprising a second failure detection
sensor for detecting a failure of the substrate under said guide ring, and a third failure detection
sensor for detecting a failure of the substrate outside of said substrate holding member.

5. The polishing apparatus according to claim 1, wherein said first failure detection sensor
comprises a supersonic sensor.

6. The polishing apparatus according to claim 1, wherein said first failure detection sensor
25 comprises a supersonic sensor to measure a distance between said supersonic sensor and an object
or to measure a sound pressure from the object.

7. The polishing apparatus according to claim 1, wherein said first failure detection sensor
comprises a radiation temperature sensor.

8. The polishing apparatus according to claim 1, wherein said first failure detection sensor is to detect a variation in electrostatic capacity of a condenser.

5 9. The polishing apparatus according to claim 1, wherein said first failure detection sensor has a piezoelectric element that is to abut the substrate.

10 10. The polishing apparatus according to claim 1, further comprising a control unit to stop said polishing tool or said substrate holding member when said first failure detection sensor detects a failure of the substrate.

11. A polishing apparatus comprising:
a polishing tool;
a substrate holding member to hold a substrate and to press a surface of the substrate against said polishing tool; and
15 at least two failure detection sensors for detecting a failure of the substrate in a radial direction of said substrate holding member.

20 12. The polishing apparatus according to claim 11, wherein said at least two failure detection sensors have a piezoelectric element that is to abut the substrate.

25 13. The polishing apparatus according to claim 11, wherein said substrate holding member includes a guide ring for holding an outer periphery of the substrate, and wherein said at least two failure detection sensors are to detect a failure of the substrate inside of said guide ring.

14. The polishing apparatus according to claim 11, wherein said substrate holding member includes a guide ring for holding an outer periphery of the substrate, and wherein one of said at least two failure detection sensors is to detect a failure of the substrate under said guide ring and the other of said at least two detection sensors is to detect a failure of the substrate inside of said guide ring.

15. A polishing apparatus comprising:

a polishing tool;

a substrate holding member to hold a substrate and to press a surface of the substrate against said polishing tool;

5 a first failure detection sensor for detecting a failure of the substrate inside of said substrate holding member; and

a second failure detection sensor for detecting a failure of the substrate outside of said substrate holding member.

10 16. The polishing apparatus according to claim 15, wherein said substrate holding member includes a guide ring for holding an outer periphery of the substrate, and wherein said first failure detection sensor is to detect a failure of the substrate under said guide ring.

15 17. The polishing apparatus according to claim 15, wherein said substrate holding member includes a guide ring for holding an outer periphery of the substrate, and wherein said first failure detection sensor is to detect a failure of the substrate inside of said guide ring.

20 18. The polishing apparatus according to claim 15, wherein one of said first and second failure detection sensors has a contact member and a measuring system for measuring an electrical connection between said contact member and said polishing tool.

25 19. The polishing apparatus according to claim 15, wherein said first failure detection sensor comprises a displacement sensor for measuring a variation in position of said substrate holding member.

20. The polishing apparatus according to claim 15, wherein said first failure detection sensor comprises a vibration sensor, a distortion sensor or a pressure sensor.

21. A polishing apparatus comprising:

a polishing tool;

a substrate holding member to hold a substrate and to press a surface of the substrate against said polishing tool; and

5 a failure detection sensor for detecting a failure of the substrate;

wherein said failure detection sensor is a displacement sensor for measuring a variation in position of a top surface of said substrate holding member.